

CHAPTER I

INTRODUCTION

1.1. Background

Learning is an interaction that aims to increase knowledge, learning experience and skills between teacher and student or student and other student. Direct learning usually aims to develop psychomotor skills and thinking abilities of students through direct interaction with learning resources such as learning modules. Meanwhile, indirect learning is usually aims at knowing specific aspects of values and attitudes. The combination of the two lessons is important to get effective learning (Astuti et al., 2016)

Quality of learning can take place through the support of several factors such as the competence of teachers in the field of study, students participation, attractive learning media and adequate learning resources. In addition to quality learning, fun learning is also needed which has an important role in the teaching and learning process because there is a strong relationship between teachers and students without feeling forced to learn. The teaching and learning process is achieved well if every aspect goes in harmony, namely between students, educators, and learning resources. Students who are assisted by educators as facilitators are able to get new information from a learning source (Fawaidah & Sukarmin, 2016).

Chemical bonding material is one of the materials in chemistry learning that is abstract and cannot be observed in real daily activities such as being unable to see atoms, atomic structure and the bonds that occur between atoms. This makes it difficult for students to understand chemical bonding, especially in the process of forming chemical bonding. From some literature, it is stated that there have been several studies that analyzed students' understanding and misunderstanding in chemical bonding, especially in recent years (Temel & Özcan, 2016). To increase the quality of learning on chemical bonding material which is considered difficult and abstract, it can be done through the application of a learning model that involves students actively thinking about linking a concept with other concept (Ismail et al., 2013). Education is a process with three dimensions, namely individuals, communities and all the content of reality both material and spiritual that plays a role in determining the nature, fate of the human form or society. Education related

to curriculum and curriculum 2013 is a curriculum that applies in Indonesia. Curriculum 2013 is a curriculum that prioritizes understanding, skills and character education, students are required to understand the material, actively discuss and present and have polite santu and high discipline (Rilanty et al., 2020).

Trianto in Okmarisa (2016) states that the Problem Based Learning (PBL) model is a learning model that is in accordance with the current curriculum and is expected to produce a productive, creative, innovative and character generation. The PBL learning model is a learning approach for students who are expected to be able to compile their own knowledge, foster higher-order thinking skills, student confidence and independence obtained from authentic (real) problems (Okmarisa et al., 2016). In addition, based on the results of previous research, students who use PBL learning models are higher than the learning outcomes of students who use direct instruction learning model (Siregar & Simatupang, 2020).

Increasing the quality of learning, besides being able to be done through the application of the PBL learning model, it can also be done through the provision of adequate teaching materials. Meyer in (Lasmiyati & Harta, 2014) states that “a module is relatively short self-contained independent unit of instructional designed to achieve a limited set of specific and well-defined educational objectives. It usually has a tangible format as a set or kit of coordinated and highly produced materials involving a variety of media.

A module may be designed for individual self paced learning and may employ a variety of teaching techniques. Module is teaching material whose contents are relatively short and specific which are arranged to achieve learning objectives. Module usually have a series of well-coordinated activities related to material and media and evaluation. One of the characteristics of a module is the principle of independent learning. Independent learning is a way of active learning and participation to develop individuals who are not tied to the presence of teachers, lecturers, face-to-face meetings in class, the presence of school friends.

Learning carried out during the current Covid-19 pandemic is online learning. From this learning system students are expected to be able to learn without interacting directly with the teacher. This causes the distribution of textbooks from schools or the use of textbooks for students to be difficult to obtain. Therefore

textbooks in the form of e-modules are very important for students in online learning because they are very practical and can be opened anywhere and anytime. In addition, how to get the e-module does not need to interact directly with students and teachers so that the recommendation to learn with physical distancing can be achieved.

Evaluation in the form of formative and summative tests is a component that must be in the Learning Module. The result of observation carried out by the study found that the textbooks used by students in learning activities at school had presented various materials that could invite students to learn actively and present various systematic material concepts. However, it does not train students' thinking skills in assessment activities. In improving students' thinking skills, tests or questions are needed that practice these skills, namely HOTS (High Order Thinking Skill) problem.

Based on the result of the research conducted, it shows that the learning system using a high-level skill system will make students free in delivering material according to what they understand and can be connected coherently (Sumantri & Widjajanti, 2019). Learning using HOTS problem is also able to make students solve problems and present them in front of the class. The conclusion from the results of the study shows that the HOTS problem use child development as a context for directing students to use their mathematical thinking (Putri & Zulkardi, 2018). HOTS problem can be developed in a way that does not limit students in submitting conjectures, ideas or opinions. In a study (Wahid & Karimah, 2018) . HOTS can also be developed by asking students to look for alternative answers or asking students to conclude with their own creativity.

The results of research conducted in 2019 at SMA N 1 Sijunjung and SMA N 7 Sijunjung show that the integrated chemistry module of the PBL model developed has very high validity and practicality categories. This shows that the module contains scientifically correct information and is easy for students and teachers to use in learning. PBL steps in the module guide students to find concepts independently and practice their critical thinking skills (Sari et al., 2019). The integrated PBL module which is based on Nursolekah research in 2019 has the benefit of improving the critical thinking skills of students who initially have

difficulty understanding the material. Indicators of critical thinking skills in learning are included in the form of questions in the module (Nursolekah & Suparman, 2019). In addition, research in 2019 the integrated PBL module developed by Kusumah received a suitable category. Student learning outcomes in the experimental class after using the integrated PBL model were better than students in the control class who used conventional learning modules.

This is the reason that the integrated PBL module can play a role in improving student learning outcomes (Kusumah et al., 2020). Based on the results of interview conducted with teachers of SMA N 1 Muara, there are most grade X science students who didn't reach kkm grade standard, especially in chemistry subject. This causes most of the students' learning outcomes at SMA N 1 Muara to be low.

Based on the description above, the researcher is interested in conducting research in the form of developing a learning e-module equipped with HOTS problem that can develop creative thinking and encourage student activity with the title **“THE DEVELOPMENT OF CHEMICAL BONDING E-MODULE INTEGRATED PROBLEM BASED LEARNING MODEL AND HOTS PROBLEM”**

1.2. Identification of Problems

Based on description in the background, then identified the following problems:

1. Students difficult to understand the chemical bonding topic
2. Student learning outcomes on chemical bonding topic are low
3. Student handbook in schools do not develop students' higher order thinking skills
4. There are not many chemical bonding E-module integrated Problem Based Learning Model and HOTS Problem

1.3. Problem Statement

Based on the explanation in the background, the problem identification is as follows:

1. What are the result of the analysis of disadvantages of the handbook used in the school?
2. What is the feasibility level of the Chemical Bonding E-module Integrated Problem Based Learning Model and HOTS Problem based on BSNP?
3. Are the learning outcomes of students who use the chemical bonding E-module integrated Problem Based Learning Model and HOTS Problem higher than KKM?

1.4. Scope of Problems

So that this research does not deviate from the research objectives, the problem in this research must be limited. Based on the problem formulation, the problem boundaries are as follows

1. This research was conducted in high schools that apply the 2013 curriculum in class X in the odd semester
2. This research focuses on the atomic stability, lewis symbol, ionic bonding and covalent bonding topic

1.5. Objectives of Research

The research objectives to be achieved from this research are as follows:

1. To find out the result of the analysis of disadvantages of handbook used in school
2. To find out the feasibility level of the Chemical Bonding E-module integrated Problem Based Learning Model and HOTS Problem
3. To find out the learning outcomes of students who use the Chemical Bonding E-module Integrated Problem Based Learning Model and HOTS Problem higher than KKM

1.6. Benefits of Research

The benefits expected from this research are as follows:

1. Chemistry teachers can use these module as a learning resource to make the learning process interesting and efficient and the achievement of learning objective
2. Researcher can develop and make teaching materials that are of good standard for use by students
3. Students that studied chemistry can understand and improve their thinking skills in chemical bonding topic
4. For future researchers can make contributions or reference ideas in other research

1.7. Operational Definition

Based on the previous explanation, the operational definition in this study is as follows:

1. The development referred to in this research is the preparation of modules based on the results of the analysis of the advantages and disadvantages of modules or other materials used in schools.
2. The e-module referred to in this research are teaching materials containing a brief description of module contents, instructions for learning and use of module, learning objectives, material descriptions tailored to the PBL Model, discussion forums, summaries and formative tests.
3. HOTS referred to in this research is a matter that has cognitive aspects of C4, C5, and C6 chemical bonding material
4. Chemistry learning outcomes referred to in this research are students' abilities measured from the cognitive aspect.